

Santos' Loss Forces Them Back to The Drawing Board on Unapproved Barossa Gas Project

But it is Not Just the Drilling Program that Lacks Approval Now that CCS is Included in the Project Plan

Executive Summary

Within hours of losing in the Federal Court on 2 December 2022¹, gas giant Santos has announced it will once again 'proceed with applications for all remaining approvals' to continue with its Barossa gas development off the Tiwi Islands in Australia, presumably consulting properly this time.

Dennis Tipakalippa's win, upheld by the Full Federal Court of Australia, confirmed that Santos had failed to adequately consult with Traditional Owners in establishing the Barossa gas project. The Federal Court victory upheld the Tiwi plaintiff's earlier win² against Santos' right to drill in their sea country without consulting them.

The court overturned approvals for Santos' \$4.7 billion Barossa offshore gas project. In doing so, it set aside³ the National Offshore Petroleum Safety and Environmental Management Authority's (NOPSEMA) approval of the Barossa Gas Project's Drilling Environment Plan.

The project is now without approval and, in terms of scope, has been for some time.

Credit Suisse has emphasised that delays from the verdict could take up a lot of Santos' time as a fresh environment plan could take between five and 18 months and would need to be reviewed afresh across the entire project.⁴

IEEFA submits that Santos and its proponents are utilising the recently added Bayu-Undan Carbon Capture and Storage (CCS) part of the plan as justification for an unapproved and unjustifiable project, and that the Barossa project is not viable.

¹ ABC. Santos loses Federal Court appeal over Barossa gas project after challenge by Tiwi Island traditional owners. 2 December 2022.

² ABC. Tiwi Islands traditional owners win court challenge against gas company Santos' massive Barossa offshore project. 21 September 2022.

³ Santos. Full Federal Court decision for the Barossa gas project. 2 December 2022.

⁴ The Australian. Implications for Woodside Scarborough project thanks to court's ruling against Santos. 1 December 2022.

The high-emissions Barossa gas project is unviable, economically and environmentally.

Any pursuit of further approvals by Santos must now happen before further project implementation continues. There needs to be full approval of the project, including for CCS, before the commencement of the gas project operations. This is not an unreasonable demand in a nation and world increasingly affected by and concerned about the impacts of climate change.

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There are three key reasons why this new gas export project should not proceed.

1. Public announcements show Santos was already building a gas development without approval

The project which Santos management has promoted and continued to build is not the same project that NOPSEMA approved in March 2018. That project was ConocoPhillips' interest in the Barossa gas field, which Santos bought in 2019, banking on the approvals that were a part of that deal.

2. CCS is unlikely to reduce Santos' very high CO₂ emissions from Barossa

Barossa gas is the dirtiest gas used to make LNG in Australia, in terms of its 18 volume percent carbon dioxide content. It is three times higher than the nearly depleted Bayu-Undan gas (in the Timor Sea) that the Darwin liquefied natural gas (LNG) plant currently processes. Barossa's CO₂ content is six times higher than in the gas processed in the NWS LNG plant in WA.

Consequently, on completion of its Barossa gas to Darwin LNG 'backfill' development, as described initially and approved, the Barossa LNG project would have produced LNG with an emissions intensity of 1.5 tonnes of CO₂ per tonne of LNG, which is twice the current average for the Australian LNG industry.

Santos has proposed using CCS to sequester a portion of the emissions to counter the criticism that it is building 'a CO₂ factory with an LNG by-product'. However, this would leave even more emissions – from combustion to power the LNG process and piping CO₂ for 800km around the Timor Sea.

As originally approved, the total CO₂ emissions for the project were estimated at about 5.4 million tonnes per year (more than 1% of Australia's total). The 3.7 million tonnes of LNG per year produced from Barossa gas at the Darwin LNG plant would emit about 16 million tonnes of CO₂ per year when shipped to North Asia and burnt for power generation and other uses.

Adding CCS may not result in any reduction because as the amount stored increases, the volume of extra dirty gas used to separate and move the CO₂ to storage will also increase. This needs to be calculated and declared for assessment and submitted for consultation and approval.

3. Santos already announced the Bayu-Undan CCS project, despite lacking approval

Santos announced in August 2022 that the Barossa project was 43% complete and scheduled production for the first half of 2025. It also announced that the Bayu-Undan CCS project could store up to 10 million tonnes of CO₂ per year. However, the Northern Territory government is yet to approve this aspect of the project.

Going forward, Santos must now run the approvals process for the complete project with CCS aspects and submit an environmental impact statement (EIS) for its Bayu-Undan CCS *at the same time* if it is to be seen as acting in good faith.

Santos must reveal how CCS would affect the emissions and have it approved by NOPSEMA, the Northern Territory Environmental Protection Authority, the Tiwi people and the Timor-Leste government before it proceeds with construction.

Public Announcements Show Santos was Already Building a Gas Development Without Approval

The original approval via the Australian government's National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) in March 2018 was for an Offshore Project Proposal (OPP) by ConocoPhillips, the relevant permit operator at the time.⁵ In 2019, ConocoPhillips sold its Barossa interest to Santos, with the finalisation of the sale in 2020.⁶

Since then, Santos has announced significant changes to the project's original scope to include Carbon Capture and Storage (CCS). However, it has not published the details of these changes and their impacts on emissions for suitable public and regulatory review and approval.

The carbon dioxide (CO₂) emissions from the Barossa project, assessed from the OPP information, would be 5.4 million tonnes per year to produce 3.7 million tonnes of liquefied natural gas (LNG) per year. As a result, the emissions intensity of the project (before emissions from shipping, then re-gasification, distribution and combustion in customer countries) will be 1.5 tonnes of CO₂ per tonne of LNG. This is approximately double the average emissions intensity of the Australian LNG industry.

This project aims to convert high CO₂ raw Barossa gas – a gas that contains much more CO₂ than any other converted to LNG in Australia, or possibly globally – into

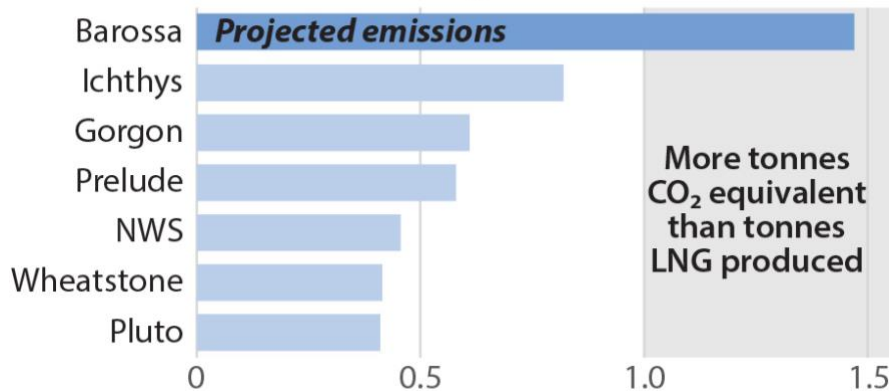
⁵ ConocoPhillips Australia. [Barossa gains OPP approval](#). 21 March 2018.

⁶ Santos. [Santos completes ConocoPhillips northern Australia acquisition](#). 28 May 2020.

methane or natural gas (the product consumers use). This makes it a highly polluting project from the outset.⁷

Figure 1: Australia's LNG Carbon Intensity

Emissions from Barossa will be greater than LNG produced



Source: Boiling Cold/CCWA

Further, the 5.4 million tonnes of CO₂ per year from Barossa (as originally approved) is approximately 1.2% of Australia's total greenhouse gas emissions estimated for March 2022. This percentage would increase over the project's 20 years of operation of the Darwin LNG plant as Australia's emissions reduce through the transition of the electricity, transport and industrial sectors.

CCS is Unlikely to Reduce Santos' Very High Gas Emissions from Barossa

Extra compression to move several million tonnes of CO₂ across several hundred kilometres requires massive amounts of energy.

According to Santos' plan, it will move about two million tonnes of CO₂ from the gas field roughly 300km to the Darwin LNG plant. There, it will remove the extra CO₂, liquefy it and then pump it 500km away to the intended Bayu-Undan re-injection reservoirs. Then, at Bayu-Undan, the gas/liquid would require further compression/pumping up to a high pressure to re-inject it into the depleted geological structures 4km below the sea floor.⁸

If Santos is entering the approvals process again, it must also explain the source of the compression energy and the power required to operate the Bayu-Undan platform CO₂ injection along with its accommodation, etc. Will it preserve some of the near-depletion gas-containing structures in production mode, and when might

⁷ IEEFA. [Should Santos' Proposed Barossa Gas 'Backfill' for the Darwin LNG Facility Proceed to Development?](#) 1 March 2021.

⁸ IEEFA. [How to save the Barossa Project from itself.](#) 1 October 2021.

these reserves be depleted? Or will diesel fuel be brought out to the platforms? If so, will special approval from NOPSEMA be required for this dual-purpose function?

Santos Already Announced the Bayu-Undan CCS Project, Despite Lacking Approvals

Santos announced in August 2022 that the Barossa project was 43% complete and scheduled production for the first half of 2025.⁹ It also announced that the Bayu-Undan CCS project¹⁰ would store up to 10 million tonnes of CO₂ per year.¹¹ However, the Northern Territory government, NOPSEMA and the Timor Leste government are yet to approve this aspect of the project.

Australia's dual approvals system for off- and onshore gas developments is confusing. As part of the system, NOPSEMA approves offshore petroleum developments in Commonwealth waters, and local, State, or Territory environment protection agencies (EPAs) approve aspects of the same development proposal inshore and onshore.

Proponents theoretically could deliberately obfuscate their intentions for a gas project as there appears to be a lack of coordination or total project overview among the approving bodies.

It is in this context that Santos could announce the new CCS aspect of the project, despite it not being in the original approvals documents and with little fanfare or apparent consultation with the public or by the relevant approving agencies.

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When and if the CCS scheme might be approved, when would it be up and running satisfactorily?

The Northern Territory would not want to repeat Western Australia's experience with CCS at the Gorgon LNG project.¹² In that case, three leading global oil and gas companies built and commissioned the CCS facilities years after LNG exports commenced, and then the companies have been unable to make the re-injection scheme work near design capacity as promised to the regulator. The operators had claimed good geological knowledge of the depleted reservoirs, which first produced oil in the 1970s. But Bayu-Undan is a 'newbie' by comparison in terms of its

⁹ Santos. [SEAAOC 2022 – Brett Woods](#). 24 August 2022.

¹⁰ Santos. [MOU signed on Bayu-Undan carbon capture and storage](#). 14 September 2021.

¹¹ Santos. [Globally significant carbon capture and storage project a step closer](#). 9 March 2022.

¹² IEEFA. [Gorgon carbon capture and storage: The sting in the tail](#). 29 April 2022.

production history and state of geological knowledge which only commenced in the 2000s.

If Santos does get further approval, not just for the substantially revised Barossa gas project but also for the CCS aspect, it remains evident that Barossa gas should *not* be exported as LNG before a demonstration of successful storage of its associated CO₂ emissions at Bayu-Undan.

Santos should be required to have this CCS scheme and estimates of its combustion emissions integrated with the revised Barossa gas scheme approved after public scrutiny and due consideration and the CCS portion to be completed before producing from the Barossa gas reservoir.

An Economical Method of Capturing CO₂ From Combustion Currently Does Not Exist

Santos announced it is striving to achieve net zero ambitions by 2040¹³, which is about ten years after the Darwin to Bayu-Undan CCS could be ready if the project is approved.

With carbon offsets now under a cloud¹⁴, it is hard to see how it could achieve net zero if it were to develop the dirtiest gas resource in Australia so far, the 18 volume% CO₂ Barossa gas. Further, the financial status of such a project cannot be attractive with only a short operational life to 'net-zero'.

Santos claimed that CCS would reduce Scope 1 and 2 emissions from oil and gas developments.¹⁵ This must assume that an economical method of capturing CO₂ from combustion exists, which it currently does not, even after decades and billions of dollars of research globally.

The majority of the Barossa project's emissions (as previously approved) are from gas combustion for power generation, and only a minority comes from venting the CO₂ captured from the reservoir gas before liquefaction. Carbon capture from high-pressure methane (the majority hydrocarbon in natural gas) is a well-proven and standard process. But capture from flue gas streams at atmospheric pressure, which has mostly water vapour and nitrogen with only a small portion of CO₂, is much more complicated and still not commercially viable.¹⁶

¹³ Santos. [Santos to be net-zero emissions by 2040](#). 1 December 2020.

¹⁴ The Australia Institute. [Serious Integrity Concerns Around Australia's 'Junk' Carbon Credits](#). 22 September 2021.

¹⁵ Santos. [SEAAOC 2022 – Brett Woods](#). 24 August 2022.

¹⁶ CSIRO. [Further assessment of emerging CO₂ capture technologies for the power sector and their potential to reduce cost](#). March 2019.

The Proposed CCS Scheme is Considerably More Complex than Chevron's Barrow Island Project in Western Australia

If approved, presumably, the Bayu-Undan CCS scheme (also called the Darwin CCS scheme) will rely on maintaining the CO₂ inventory in the 500km pipeline¹⁷ from Darwin in a liquid state. This is an unusually long line for a CO₂ pipeline, particularly for an offshore line through warm tropical waters.

The calculations for such a pipeline are complex and very important because a liquid that can vaporise is likely to arrive by pipeline at an offshore platform in a mixed vapour/liquid condition. This can take the form of liquid 'slugs' that could arrive at great speed and must be 'caught' safely and without damaging the receiving facilities, including the 20-year-old platform itself.¹⁸ This makes this CCS scheme considerably more complex than Chevron's CCS plant.

Santos claims¹⁹ it does not anticipate any material cost or schedule impact during the necessary new approvals process and continues to say it will deliver the first gas from the Barossa gas project in the first half of 2025.

Conclusion

The high-emissions Barossa gas project is unviable, economically and environmentally.

Any pursuit of further approvals by Santos must now happen before further project implementation continues. There needs to be full approval of the project, including for CCS, before the commencement of the gas project operations. This is not an unreasonable demand in a nation and world increasingly affected by and concerned about the impacts of climate change.

¹⁷ AEMC. NT: [Bayu Undan to Darwin Pipeline](#).

¹⁸ Slug catchers are a standard part of many, if not all onshore gas treatment plants. Offshore platforms receiving wet gas have other arrangements, including short delivery pipelines and vessels to catch and separate the gas/liquids. It's unlikely there are any platforms on the receiving end of a 500km pipeline carrying a vaporising liquid.

¹⁹ Santos. [Full federal court decision for the Barossa gas project](#). 2 December 2022.

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The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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